



LINEBERGER COMPREHENSIVE
CANCER CENTER



SCHOOL OF MEDICINE
North Carolina Translational and Clinical Sciences Institute

WELCOME TO THE LAY ABSTRACT WORKSHOP!

Patty Spears

Patient Advocacy

Lineberger Comprehensive Cancer Center

Summer Choudhury

Participant Engagement & Accrual

NC TraCS Institute- a CTSA Hub

March 17th, 2023

REMINDERS

- Please remain muted unless you are asked to speak
- Use the "raise hand" button if you have a question you would like to ask out loud
- Participation is encouraged – keep cameras on if possible
- Ask questions in the chat

PATTY SPEARS



Ms. Spears is an over 20-year breast cancer survivor and a 1-year liver cancer survivor. She has been a cancer research patient advocate for over 20 years. She is currently working as a scientific research manager and patient advocate at Lineberger Comprehensive Cancer Center (LCCC) where she leads the UNC Lineberger Patient Advocates for Research Council (PARC) and the UNC Breast SPORE Advocates. At UNC she focuses on communicating research to the public and facilitates the engagement of patient advocates with Lineberger researchers and clinical trials. Patty is also a patient advocate for national organizations including the National Cancer Institute (NCI), American Society of Clinical Oncology (ASCO), American Association for Cancer Research (AACR) and the National Clinical Trials Network (NCTN).

SUMMER CHOUDHURY



With over a decade long tenure in research, Summer's background in high-intensity clinical settings and public health allows her to operationalize practical research strategies with both patients and investigators in mind. In her current role at the NC TraCS Recruitment & Retention Program, she focuses on reviewing grants and protocols for feasibility, educating investigators on language best practices and developing ongoing relationships with community, patient and staff advisory boards. Summer is committed to developing evidence-based, multi-modal research plans for investigators across the UNC enterprise that is rooted in creativity, inclusivity, and care. Her own research interests and publications focus on patient and caregiver experiences, provider-patient communication, and informed consent.

MARY LEE MACKICHAN



Mary Lee MacKichan, PhD, is a Lineberger Research Associate who received her Bachelor's and Doctorate degrees from Stanford University. She participated in the Hooper Foundation Fellowship at the University of California, San Francisco. Mary Lee has a plethora of experience in both scientific research (vaccine and small molecule drug discovery) and scientific writing, and has worked as a science writer and editor for peer-reviewed journals. She also has experience with regulatory writing and grant proposal writing. She currently provides writing and grant development support for Lineberger members.

VERNAL BRANCH



Vernal Branch brings her 29 years experience as a breast cancer survivor and trained advocate in many areas. She has been reviewer and chair for the Dept. of Defense and the CA Breast Cancer Research Programs. As an African American she was able to assist in recruitment and outreach NIEHS Sister Study. Presently, Vernal is serving NCI Alliance for Clinical Trials GU and Prevention Committees. Vernal has helped with protocol design with several institutions, University of Virginia, Johns Hopkins University and now is a member of the UNC SPORE advocate.

LAURIE BETTS



Laurie Betts is a 4-year esophageal cancer survivor. She joined the Lineberger Cancer Cancer Patient Advocates for Research over three years ago. She has experience as a Patient Advocate Consultant for UNC applicants (successful) for V foundation and ASCO grants. Laurie helps new cancer clinical trials study coordinators learn their craft by participating in mock consenting sessions as the practice patient. She has helped edit new UNC clinical trials consent forms to bring the patient perspective to them. Laurie has participated for several cycles in reviewing UNC Lineberger Developmental Award applications (Basic Science) as a patient advocate reviewer. She participates regularly in the UNC Lineberger Patient Advocates for Research Council (PARC). Laurie has participated in the American Association for Cancer Research (AACR) Scientist-Survivor Program for several years and is a member of the Cancer and Evolution Working Group at AACR.

LAURA JENSEN



Laura's background in human resources, for the American Cancer Society (18 yrs), exposed her to cancer patients, oncologists, cancer research, and working with volunteers. She was a caregiver for her husband during his year-long treatment for non-Hodgkin's Lymphoma before she herself was diagnosed with two different breast cancers. During her recovery, Laura turned to her love of writing. She wrote and published several short stories. She is eager to take her background and writing skills to her current role as an advocate. For example, not long ago as a breast SPORE advocate she helped in reviewing the material for Carolina Breast Cancer Survey questionnaire. She assisted a researcher with grant preparation and served as the advocate on the grant proposal. She recently did a role play interview as part of a new study coordinators training. For the past two years she has participated in grant review evaluations for potential Lineberger grants. She is a member of the Lineberger Board of Visitors, a member of the Research Patient Advocacy Council, and a member of Patients and Researchers Together.

A BIT ABOUT YOU ALL...

1. NAME
2. DEPARTMENT
3. WHAT BEHAVIORS OR RESPONSES HAVE YOU OBSERVED WHEN TRYING TO EXPLAIN YOUR WORK TO SOMEONE WHO DOESN'T QUITE UNDERSTAND?

OBJECTIVES

1. DESCRIBE THE IMPORTANCE OF LAY ABSTRACTS
2. REVIEW KEY FEATURES OF IMPACT STATEMENTS
3. APPLY TOOLS TO EDIT YOUR OWN LAY ABSTRACT
4. LEARN ABOUT RESOURCES AVAILABLE TO GUIDE YOUR ABSTRACT

TOP 5 REASONS THIS IS IMPORTANT

1. Funding comes from donors and donors want to make a difference
2. Patients and Advocates will review your grant application, read your abstract and contribute to the score.
3. This is just the beginning of your lay language practice.
 - Plain Writing Act of 2010
 - Most agencies have a policy.
4. Studies show and community/patient partners state this as a need.
5. Because you want to share your work.

“A lay abstract should explain to any non-expert why your research is important and necessary”
– LB, Cancer Survivor

Having a plain language version makes me more confident about asking questions concerning the study and offers me a more grounded view of the study. The common vocabulary enables me to use more deeply my patient perspective to analyze and evaluate a study both for its scientific merit as well as the significance to a patient population.
- DS, Community & Patient Advisor

Lay abstracts address the specifics of patient needs and what a grant will do to address those needs.
– LJ, Cancer Survivor

POLL: TRUE OR FALSE?

You only need to learn
this lay language stuff
for this grant abstract.

Materials this applies to...

- Journal articles
- News stories for the public once your discovery is famous.
- Print ads (flyers, brochures)
- Social Media
- Websites, digital ads
- Telephone scripts
- Email templates, mailed letters
- Informed Consent Forms, Consent aids
- Survey instructions
- Study Documents
- Study Results
- Fundraiser speeches.
- Info Sheets/Educational Materials.
- Return of results/Dissemination
- Registry Newsletters



HOW TO MAKE AN IMPACT STATEMENT



COMMUNICATING IMPACT

- What should you avoid when writing or speaking about how your research will 'impact' patient?

What is a good 'impact statement'?

It's complicated

It is complicated to
keep it simple



AVOID USING THE WORDS “IMPACT” AND “AFFECT”

- Avoid using impact and affect because they are vague and consequently unclear by themselves they don't mean anything in particular
- Use more precise words (verbs)

 Dr. Jones **had an impact on medicine.**  Dr. Jones **influences women to enter the field of medicine** 

 The policy will **affect the amount of paperwork required**  The policy will **increase paperwork.** 

MY SUGGESTIONS FOR A GOOD IMPACT STATEMENT

- Describing impact to patients is not just one sentence
- Don't be vague

'The results from this research will lead to new drugs to treat triple negative breast cancer'

- Be specific

*'...this will be an oral drug which will reduce the cost for patients by decreasing clinic visits',
'... is more specific to the target which has the potential to have fewer side effects when given to patients.'*

- Show that you care and are excited to do research that will improve the lives of cancer patients

COMMUNICATING THROUGH A PUBLIC ABSTRACT

What should you include in your public abstract (summary)?

1. Why is your research important to patients?
2. What question are you answering?
3. Why do you think your research will succeed?
4. How will your research ultimately improve the lives of patients?

Writing a Lay/Public Abstract

A summary about your research...

- What do you hope to prove?
- Why is it important to patients?
- Why do you think it will work/be successful?
- How may it ultimately improve how people feel, function, or survive?



What You Need to Know

Think about your audience

Use common, everyday words
Keep it short and to the point

Avoid medical jargon and acronyms

Keep sentences to less than 15 words and brief paragraphs.

Split 1 long sentence into 2 short sentences

Organize and filter content

Use clear descriptive headings
Include only what your audience needs to know
Use bulleted lists where practical

Start with a good title or short descriptive paragraph highlighting the importance of your research

Use meaningful headings

Logically walk the reader through your research

Other things to keep in mind

Use complete sentences
Use appropriate punctuation and grammar
Spell check

Every sentence should have a noun and a verb

Appropriate grammar makes it easier to read and understand

Misspellings are not good

Writing about impact

Be precise and specific
How will your research improve the lives of patients
If successful what will it lead to a solution for an overarching research challenge

Do not use vague words like impact and or affect

It may take more than one sentence to be more specific

Tell the reader why this research is important to this field of research

When you think you are done...

Proofread with fresh eyes
Read it aloud
Take it for a test drive – give it to a non-scientific person to read

Resources

[Hemingway](#) – check for readability
[Grammarly](#) – check for readability
[NCI Dictionary](#) – definitions of common cancer terms

POLL: TRUE OR FALSE?

READABILITY,
PLAIN LANGUAGE
AND HEALTH
LITERACY
CAN BE USED
INTERCHANGEABLY.

READABILITY

NOW THIS LOOKS LIKE
SOMETHIN' I'D READ!



PLAIN LANGUAGE

I'M UNDERSTANDIN' ALL
THIS INFO UP IN HERE!



HEALTH LITERACY

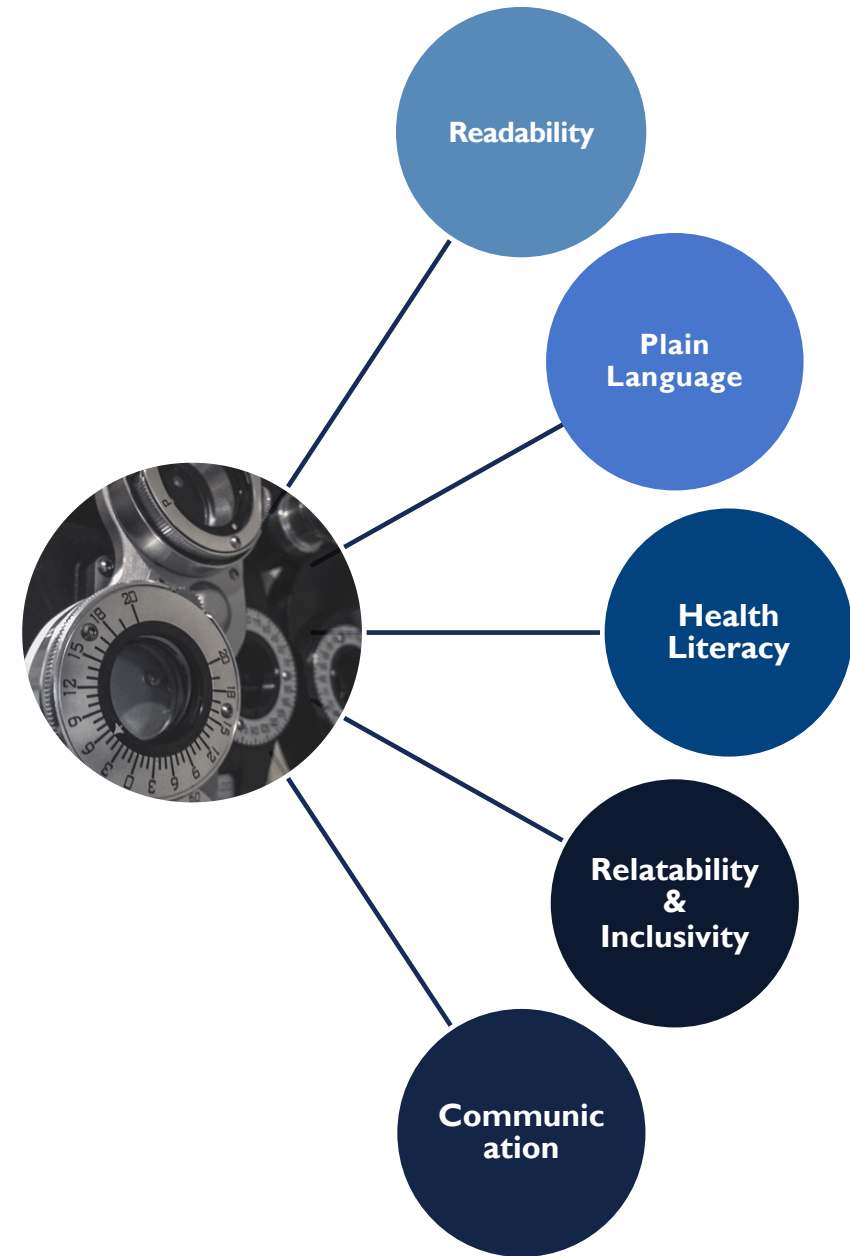
I'M GONNA GO MAKE
SOME INFORMED DECISIONS!



From Communicate Health

‘MAKE IT CLEAR’ MODEL

1. Find the impact statement and see if it aligns with the statement of novelty.
2. Use Microsoft Word or Hemingway to determine reading level.
3. Define the literacy ability of my audience.
4. Use plain language dictionary to rewrite.
5. Make sure I haven’t offended anyone and spell checked.
6. Read it out loud.



LENS #1: START WITH READABILITY

Hepatocellular carcinoma (HCC) is the 4th leading cause of cancer-related deaths in the world, and the most rapidly growing cause of cancer deaths in the United States. According to “Cancer Statistics, 2023” ... mortality rates continue to grow for liver cancer over the past 4 decades. Early detection of HCC (size < 2cm) is still the key for patient survival given that curative therapies such as surgical resection and liver transplantation are only available for early-stage HCC, rendering early diagnosis of HCC imperative.

The carcinogenic pathway of HCC is poorly understood. Many risk factors have been reported. Among them, obesity is one of the best-documented and is also strongly associated with higher mortality rate in HCC patients. With the radical advance of treatment options for viral hepatitis, fatty liver disease has quickly become the dominant hepatitis pattern in the chronic liver disease and serves as a leading risk factor for HCC. The prevalence of non-alcoholic fatty liver disease (NAFLD) correlates with the obesity rate, close to 50-90% in obese population. ... It is estimated that 15-20% of patients afflicted by chronic liver disease will develop liver cancer during their lifetime.

It is difficult to study cancer mutational pathways in a genetically highly variable and uncontrollable human population. Intriguingly, we have identified rare cases of HCC arising in association with benign adenoma-like tissue in the pathology specimens from the same individuals. They are ideal models to do the comparative study between malignant tissue and its benign counterpart in a genetic background of the same individual patient. Studying the divergent mutational changes between the coexisting two different patterns of tumor may present a unique opportunity to understand the genetics underlying carcinogenesis in liver. The study can also lead to the identification of biomarkers for early liver tumor diagnosis and treatment.

Hepatocellular carcinoma (HCC) is the 4th leading cause of cancer-related deaths in the world, and the most rapidly growing cause of cancer deaths in the United States. Interestingly, we have learned that in rare cases, HCC may start out as a non-cancerous tumor called benign adenoma and change into HCC. Scientists do not currently have a full understanding of how this happens. If we understood the earliest moments of when this non-cancerous tumor becomes cancerous, we can create better liver cancer tests and help patients have the most treatment options. Our research team believes we could understand this change by comparing the malignant and benign tumors from the same individual patient. We hope that researching the change pathway between benign to malignant will allow us to discover signs of HCC earlier.

Visibility & Eye Movements

- Add white space for visual appeal if formatting allows
- Put information in manageable “chunks.”

Fatigue in reading

- Readability Hack: Use words with 1-2 syllable words
- Pick most important 1-2 statistics.

Rate of work (reading/skimming speed)

- Tell the story in chronological order.
- Be consistent with terms throughout
- Delete extra details

LENS #2: PLAIN LANGUAGE

Hepatocellular carcinoma (HCC) is the 4th leading cause of cancer-related deaths in the world, and the most rapidly growing cause of cancer deaths in the United States I. Interestingly, we have learned that in rare cases, HCC may start out as a non-cancerous tumor called benign adenoma and change into HCC. Scientists do not currently have a full understanding of how this happens. If we understood the earliest moments of when this non-cancerous tumor becomes cancerous, we can create better liver cancer tests and help patients have the most treatment options. Our research team believes we could understand this change by comparing the malignant and benign tumors from the same individual patient. We hope that researching the change pathway between benign to malignant will allow us to discover signs of HCC earlier. (12th Grade)

Hepatocellular carcinoma (HCC) is a growing cause of cancer deaths in the United States. Interestingly, we have learned that in rare cases, HCC may start out as a non-cancerous tumor called benign adenoma and become HCC. Scientists do not currently have a full understanding of how this happens. We want to compare the cancerous and non-cancerous tumors from the same individual patient. Our hope is that if we can understand the path from non-cancerous to cancerous early, we can detect signs of HCC earlier. If we can understand exactly when a benign tumor becomes cancerous, we can create better liver cancer tests. This may also help patients have the most treatment options. (9th grade)

Content:

- Anticipate the reader's questions, and answer them preemptively.
- Ensure you answer "so what?"

Paragraph Structure:

- Get to the point first.
- Use active voice and a conversational tone.
- Second person point-of-view.

Words:

- Skip the jargon and extraneous words.
 - **Pro Tip:** this helps you not get scooped either!
- 6th-8th grade reading level
- Avoid abbreviations and acronyms w/o explanations

COMMON OFFENDERS

Original		Modified
Metastasis	→	Spread to other parts of the body.
Proliferation	→	Growth or increase in the number of cells
Engineered to have	→	Made to have
Microenvironment	→	Area around the tumor
Microscopic	→	What it looks like using a microscope
Wild-Type	→	Normal or non-cancer
Physiological effects	→	Effects on the body
Transcribed into RNA	→	Made into RNA
Deficiency	→	Lack of
Chronic	→	Continuous; on going; lasting
Resistance	→	Lack of response
Algorithms	→	Programs; Other?
Elicit tumorigenesis	→	Cause cancer
High affinity	→	Bind tightly
Phenotype	→	Observable characteristic
Genotype	→	Genetic characteristic
Oncogene	→	Gene that can cause cancer cell growth
Suppressor gene	→	Gene that suppresses the growth of cells..



POLL: TRUE OR FALSE?

Education is the only
thing that determines
a person's health
literacy.



LENS #3: HEALTH LITERACY

Hepatocellular carcinoma (HCC) is the 4th leading cause of cancer-related deaths in the world, and the most rapidly growing cause of cancer deaths in the United States I. Interestingly, we have learned that in rare cases, HCC may start out as a non-cancerous tumor called benign adenoma and change into HCC. Scientists do not currently have a full understanding of how this happens. If we understood the earliest moments of when this non-cancerous tumor becomes cancerous, we can create better liver cancer tests and help patients have the most treatment options. Our research team believes we could understand this change by comparing the malignant and benign tumors from the same individual patient. We hope that researching the change pathway between benign to malignant will allow us to discover signs of HCC earlier. (12th Grade)

Hepatocellular carcinoma (HCC) is a growing cause of cancer deaths in the United States. Interestingly, we have learned that in rare cases, HCC may start out as a non-cancerous tumor called benign adenoma and become HCC. Scientists do not currently have a full understanding of how this happens. We want to compare the cancerous and non-cancerous tumors from the same individual patient. Our hope is that if we can understand the path from non-cancerous to cancerous early, we can detect signs of HCC earlier. If we can understand exactly when a benign tumor becomes cancerous, we can create better liver cancer tests. This may also help patients have the most treatment options. (9th grade)

- **Organizational health literacy** is the degree to which organizations equitably enable individuals to find, understand, and use information and services to inform health-related decisions and **actions for themselves and others.**

(Healthy People 2030)

- **Ask yourself:** what is the health literacy of the reviewers reading this lay abstract? Is 12th grade okay here?

LENS #4: RELATABILITY & INCLUSIVITY

I am Howard. I have [prostate] cancer. **Please don't call me a cancer survivor**, a hero, a warrior, a conqueror, a victim.

Friends and family may call the person with cancer a "survivor" **to suppress their personal terror or discomfort about this condition**, or thinking cheerleading may somehow boost the morale of the person with cancer.

– Howard Wolinsky, [MedPage Today](#)

Many patients themselves adopt the battle metaphor when they receive the diagnosis. If one needs to assume a warlike attitude to face the challenges of cancer, so be it; anything goes in helping a patient (and his or her family) cope during this journey. We have all had the experience of patients stating (paraphrased) **"I want curative treatment, not palliative treatment, because I'm going to beat this thing."**

However, thinking about it from a different perspective, the use of the battle metaphor **implies a level of control that patients simply do not have.**

When is the last time you said that someone **lost his or her fight with cardiac disease?** Or with a car wreck? Or with a massive stroke? Patients in those situations have not lost a battle—they have died.

– Lee Ellis, MD et al, [JAMA Oncology](#)

"We shouldn't refer to patients by their disease. We don't want to say 'breast cancer patients' or 'women who are metastatic' or 'women who are ER-positive' because women aren't any of these things. Patients can't metastasize, and women can't be ER-positive. We're really referring to their tumor."

– Tatiana Prowell, MD, [J. Adv Prac Onc](#)

Think about your people.

- What motivates this reviewer to take action?
- Is your grant inclusive of various language speakers?
- Is there racial, gender or other factors that are applicable to your disease process?

Use terms that are relatable.

- No one says "I'm going to the pharmacy to pick up my contraception."

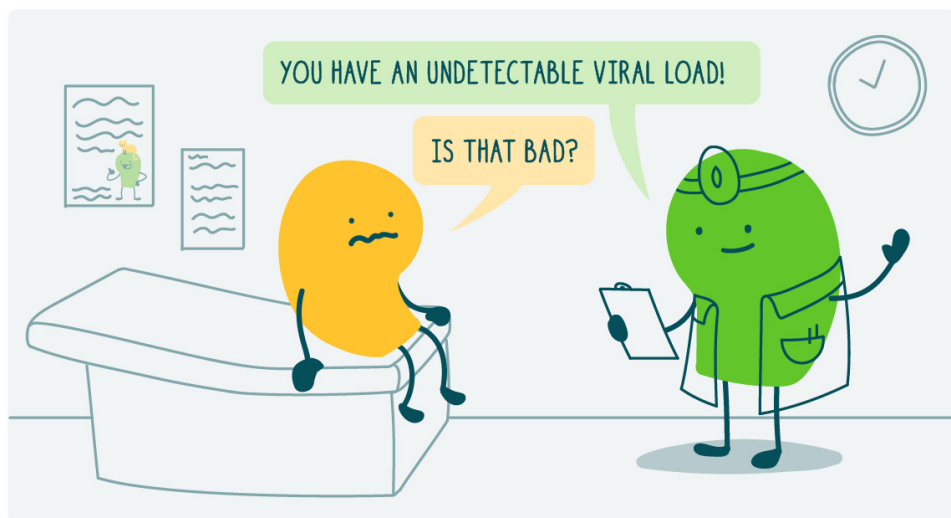
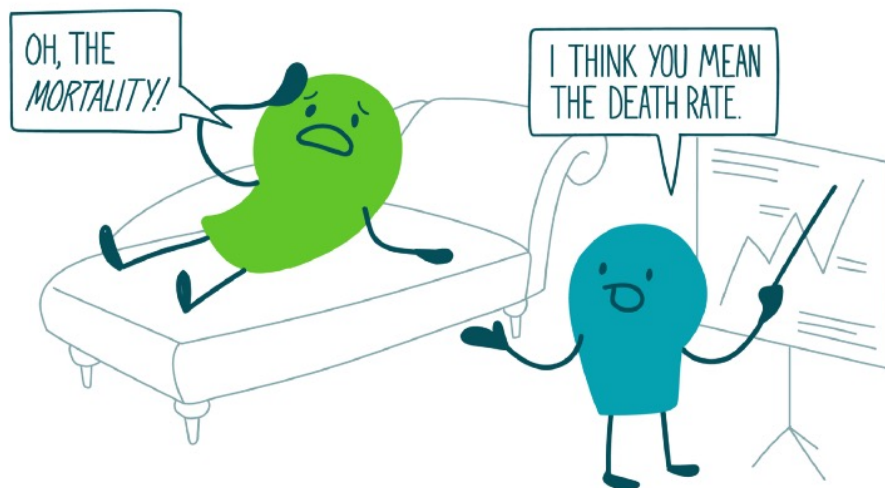
Identify language that may be offensive.

- Don't use an adjective in place of a person, use facts
 - Ex: Homeless person → person experiencing homelessness
 - Obese patients → Patients w/ BMI over 35
- Clinical terms may be offensive
 - Ex: Failure to thrive → 'Requiring attention to growth, protein-intake...'

What biases exist in your literature review?

- ☐ What populations were represented in the papers you pull or statistics you've given?

LENS #5: COMMUNICATION



Read it out loud yourself

- It helps! You'll figure out where sentences don't flow or gel.

Ask Others to comment on your lay abstract

- **Readability:**
 - Ex: Circle anything you find confusing.
- **Plain Language:**
 - Ex: In your own words, what do you think is the point of my project?
- **Health Literacy**
 - Ex: Would you volunteer to be a patient for this study?
- **Relatability**
 - Ex: Who do you think would not volunteer for this study?

Share Your Story w/ others

- You got into research for a reason. To help. To make a difference. Talk to people that this impacts, be it formal community engagement, volunteering with patients, or just the public in general.

Give yourself Grace! (self-communication!)

- This stuff is hard, and it's a skill too!
- The more you practice and surround yourself in plain language, the better you'll be

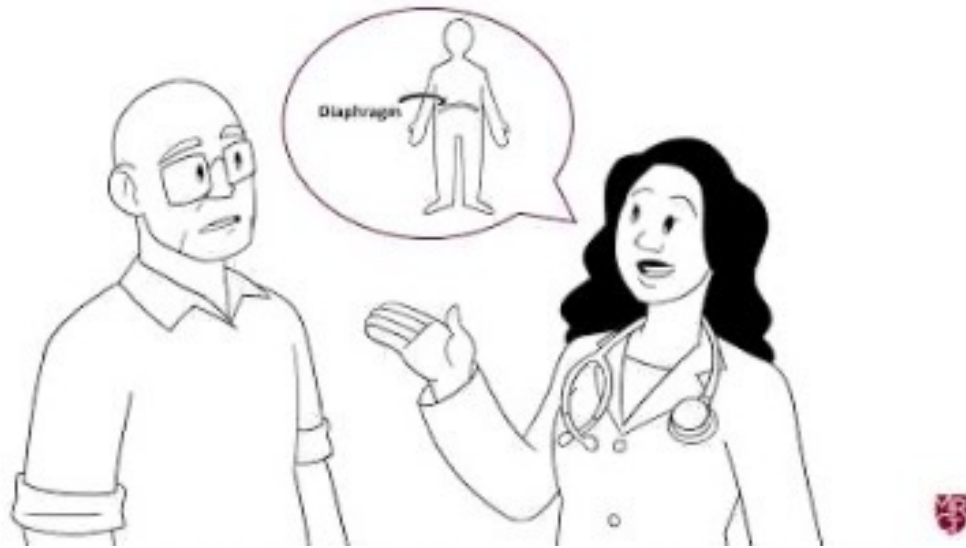


BREAK-OUT SESSIONS



CLOSING REMARKS & PRESENTER FAVORITES

Summer's Favorite Lay Language Things



[MCRT Center Health Literacy Video](#)

Patty's Favorite Lay Language Resources

Hemingway
Editor

NIH **NATIONAL CANCER INSTITUTE**
NCI Dictionary of Cancer Terms

RESOURCES & FURTHER READINGS

for your continued education (1/2)

Readability

- ☐ [Grammarly](#) or [Hemingway](#), an app for readability and grammar.
- ☐ How to turn on [Microsoft Word's](#) Flesh Kincaid Readability Statistics.
- ☐ [Readable's](#) What is Flesh Kincaid Readability?
- ☐ Quick Read on the [order of text](#).
- ☐ [This LinkedIn Learning on Plain Language](#) (42 min)

Plain Language

- ☐ [History of Plain Language in the US Government](#) ([Plain Language Act of 2010](#))
- ☐ CDC's [Clear Communication Index](#).
- ☐ [Plain Language Medical Dictionary](#). UM's thesaurus style live search on ways to explain big medical words.
- ☐ Real Life Research ICF Edited- [Sample Paragraphs](#).

Relatability & Inclusivity

- ☐ Article on Content being [Inclusive, Accessible, Fun](#).
- ☐ Quick Read on [Cultural Competence](#)
- ☐ Quick Read on ['Target Audience'](#)
- ☐ Website: [EthnoMed](#)-Integrating Culture into Clinical Practice.
- ☐ Perspective piece on [Shame](#) in Physician-Patient interaction by Harris & Darby (2009)
- ☐ This [article](#) on Equitable and Empowering Language in Grant Writing (2020)
- ☐ This [publication](#) on Words Matter: Use of Respectful Language in Oncology (2021)

RESOURCES & FURTHER READINGS

for your continued education (2/2)

Health Literacy

- ❑ Publication on Health Literacy for [Healthy People 2030](#) (Nov 2021)
- ❑ Publication on Health Literacy [gaps](#) between Physicians and Patients.
- ❑ UNC's [Health Literacy Library](#) Guide
- ❑ CDC's [Health Literacy Comprehensive Guide](#)
- ❑ Journal of Public Health Management & Practice's [Podcast on Health Literacy](#) (Apr 2021)
- ❑ Boston University's Database of Validated [Literacy Tests by Disease Type](#).
- ❑ National Center for Education Statistic's Interactive [Literacy Maps](#), the key for [literacy](#) and [numeracy](#).

Oncology Resources

- ❑ National Read on [‘Palliative Care’](#)
- ❑ Quick Reads on [Screening vs. Testing](#) and [Positive vs. Negative Results](#).
- ❑ Quick Read on [Cancer terminology](#)
- ❑ Quick Read on [User Testing Materials](#), on a [budget](#).
- ❑ JAMA Oncology's Publication on [Battle w/ Cancer](#).
- ❑ NCI's [Dictionary](#) of Cancer Terms
- ❑ [Unsplash](#): Database of free Stock Photos.
- ❑ Publication on [Biobanking Recruitment Preferences](#) of rural communities.
- ❑ Publication on [Predictors of biospecimen donation](#) (time spent w/ MDs and religion!)
- ❑ Publication on Biobanking of [pediatric samples and reconsent](#) in adulthood.
- ❑ Publication on how [analogies and metaphors](#) work in oncology communications.

thank you!

Summer Choudhury, MPH

summer.choudhury@unc.edu

Patty Spears, BS, FASCO

paspears@med.unc.edu

Want to discuss your lay abstract or project in general?

Need help with another project you're working on?

Keep it simple and make the reader want to learn more

about your project!

Request a meeting at go.unc.edu/recruitment-intake

For cancer patient advocate feedback contact us at AskCOE@unc.edu

Special Thanks to Andrea, Ashley, Mary Lee, Lauren, Mindy, Edward and the entire crew for the invitation and support!

DEVELOPMENTAL AWARDS SPRING 2023 CYCLE

- Non-binding LOI due March 28, 2023
- Application due April 18, 2023
- Apply here: <https://unclineberger.org/developmental-funding-opportunities>
- **Targeted RFAs:**
 - Developing and implementing community-engaged cancer control interventions in North Carolina
 - Cancer Survivorship Research, A Population Sciences Approach to Addressing Cancer Disparities in North Carolina
 - Single Cell and Geospatial Analysis of Experimental Samples,
 - Virology associated collaborations and projects
 - Protein binding therapeutic/diagnostic shared resource
- **Calls for proposals:**
 - Breast Cancer SPORE Career Enhancement Program
 - Breast Cancer SPORE Developmental Research Program
 - Selective Targeting of Pancreatic (SToP) SPORE Career Enhancement Program
 - Selective Targeting of Pancreatic (SToP) SPORE Developmental Research Program



Video Demo

8 minutes

BREAKOUT SESSION W/ SUMMER

Hydrocephalus is one of the leading causes of mortality and morbidity in patients with spina bifida. Fetal surgery of myelomeningocele (MMC) repair has been demonstrated to significantly reduce the need for postnatal shunting and improve neurological outcomes. However, ~40% of the patients undergoing in utero MMC repair still develop hydrocephalus and require shunting within the first year of life. In the past decade, there are no good presurgical imaging markers that can predict postnatal hydrocephalus outcome. The width of posterior horn of lateral ventricle > 15 mm at the presurgical fetal MRI is the only predictor of hydrocephalus with high specificities of 79-100% but low sensitivities. This project is aimed to build the first AI model of patients with MMC to predict the risk of hydrocephalus within the first year of life and to predict the success rate of minimally invasive endoscopic third ventriculostomy by leveraging our developed deep-learning based approach of fetal MRI and innovational longitudinal information contributed from both pre- and postnatal brain development obtained. Rather than using a conventional classification model, another innovation of our model is to adopt the verification framework that identifies a pair of subjects as belonging to the same class or not. This strategy significantly increases the training data size and enables us to better explore the high-level representation for classification/prediction in an end-to-end manner. We believe a better image-based predictive AI model will change clinical practice in the care of patients with MMC by early providing prognostic information to patients and families and aiding in clinical management after birth. These results will also be the basis of future prediction models of functional outcomes, including motor and cognitive outcomes and future application in other common fetal disorders such as isolated ventriculomegaly and midline anomaly.

Tool: <https://hemingwayapp.com>

Example #1

Complicated
opening statement.

Jargon, complicated word
Simple definition needed

- Inflammatory bowel diseases (IBD), notably Crohn's disease (CD), are chronic relapsing inflammatory disorders caused by aberrant immune responses to resident gastrointestinal (GI) microbes. Intestinal fibrosis is a significant complication in CD patients, causing severe intestinal strictures and obstructions that are ultimately relieved by surgical bowel resection.



NOTE: The first sentence is important to engage and inform the reader!

Inflammatory bowel diseases (IBD), notably Crohn's disease (CD), are chronic relapsing inflammatory disorders caused by aberrant immune responses to resident gastrointestinal (GI) microbes.

Grade 21, ease of reading 0 (word)

→ Look up definition of IBD and CD from NCI Dictionary
Create an introduction explaining the disease first.

New Sentence:

→ Inflammatory bowel diseases (IBD) is an inflammation of the colon and rectum.
Crohn disease (CD) is a type of IBD involving the small intestine and colon.

Grade 9.4, ease of reading 50 (word)



LINEBERGER COMPREHENSIVE
CANCER CENTER

Inflammatory bowel diseases (IBD), notably Crohn's disease (CD), are chronic relapsing inflammatory disorders caused by aberrant immune responses to resident gastrointestinal (GI) microbes.

Grade 21, ease of reading 0 (word)

→ NOTE: There are 2 concepts left to explain – chronic/relapsing and aberrant immune response.

Split into separate sentences

Look up chronic, relapsing and aberrant for alternate wording

Word thesaurus

NCI dictionary

New Sentences:

→ IBD can last a long time and can come back often.

→ These diseases are caused by abnormal immune responses to resident gastrointestinal (GI) microbes.



Grade 8.2, ease of reading 57 (word)

Original:

Inflammatory bowel diseases (IBD), notably Crohn's disease (CD), are chronic relapsing inflammatory disorders caused by aberrant immune responses to resident gastrointestinal (GI) microbes.

Grade 21, ease of reading 0 (word)

Edited:

Inflammatory bowel diseases (IBD) is an inflammation of the colon and rectum. Crohn disease (CD) is a type of IBD involving the small intestine and colon. IBD can last a long time and can come back often. These diseases are caused by abnormal immune responses to resident gastrointestinal (GI) microbes.

Grade 8.8, ease of reading 53.7 (word)





Inflammatory bowel diseases (IBD), notably Crohn's disease (CD), are chronic relapsing inflammatory disorders caused by aberrant immune responses to resident gastrointestinal (GI) microbes. Intestinal fibrosis is a significant complication in CD patients, causing severe intestinal strictures and obstructions that are ultimately relieved by surgical bowel resection. Mechanisms driving IBD-associated fibrosis are poorly understood but implicate the microbiome, especially adherent-invasive *E. coli* (AIEC). Previously, our work demonstrated that AIEC production of the siderophore versiniabactin (Ybt) promotes fibrosis in a gnotobiotic *Il10*^{-/-} mouse model. These pro-fibrotic effects did not require AIEC uptake/utilization of Ybt, suggesting direct effects on the host. Here we show that CD11b⁺ F4/80⁺ macrophages are abundant in the submucosa and muscularis of fibrotic lesions in IBD mouse models and human IBD patients. We hypothesized that Ybt targets host macrophages to drive fibrosis. HIF-1 α activation is a critical for immune cell function in inflammation and can be activated by metal sequestration. We demonstrate that AIEC infection drives HIF-1 α in macrophages, which is dependent upon Ybt production. In fibrotic lesions of IBD mouse models and human IBD patients, HIF-1 α is activated and nuclear-localized to macrophages. We identify that zinc sequestration is responsible for HIF-1 α activation, rather than canonical iron binding to Ybt. Furthermore, co-culture of macrophage and fibroblast cells reveal that AIEC infection induces pro-fibrotic genes, a phenomenon that requires AIEC, macrophages and fibroblasts interacting together. In the context of pro-fibrotic effects, NF- κ B activation is necessary but not sufficient, whereas Ybt unilaterally serves as a trigger for HIF-1 α activation. Collectively, these results suggest that as intestinal macrophages encounter AIEC, Ybt sequesters zinc, causes an accumulation of nuclear HIF-1 α , and this imbalance of metal homeostasis drives pro-fibrotic macrophage and fibroblast activation. Ultimately, effective fibrotic remodeling fails and leads to intestinal fibrosis in IBD patients.

Hemingway

Editor

Readability

Grade 16

Poor. Aim for 14.

Words: 296

Show More ▾

6 adverbs. Aim for 1 or fewer.

2 uses of passive voice, meeting the goal of 3 or fewer.

6 phrases have simpler alternatives.

4 of 16 sentences are hard to read.

9 of 16 sentences are very hard to read.

Hemingway Editor

Readability

Grade 10

OK. Aim for 9.

Words: 355

Show More ▼

3 adverbs. Aim for 1 or fewer.

7 uses of passive voice. Cut to 6 or fewer.

6 phrases have simpler alternatives.

7 of 31 sentences are hard to read.

1 of 31 sentences is very hard to read.

and rectum. Crohn disease (CD) is a type of IBD involving the small intestine and colon. IBD can last a long time and can come back often. These diseases are caused by abnormal immune responses to resident gastrointestinal (GI) microbes. Intestinal fibrosis (forming fibrotic lesions) is a significant complication of CD. These fibrotic lesions can cause severe intestinal strictures (narrowing) and obstructions. These complications can eventually be corrected by surgical to remove the part of the intestine that is affected. How IBD-associated fibrosis is formed is poorly understood. The microbiome may be involved. the intestinal microbiome is the microorganisms and viruses that live in the intestinal tract. One microbe of interest is adherent-invasive E. coli (AIEC). Previously, we showed that AIEC produces a molecule called siderophore versiniabactin (Ybt). We also showed that Ybt promotes fibrosis in mice. These pro-fibrotic effects did not require AIEC uptake/utilization of Ybt, suggesting direct effects on the host. Here we show that certain macrophages (a type of blood cell) are abundant in the fibrotic lesions in IBD mouse models and patients with IBD. We hypothesized that Ybt targets host macrophages to drive fibrosis. HIF-1 α activation is a critical for immune cell function in inflammation. HIF-1 α can be activated by metal sequestration (removal). We show that AIEC infection drives HIF-1 α in macrophages, which is dependent upon Ybt production. In fibrotic lesions of IBD mouse models and patients with IBD, HIF-1 α is activated and found in macrophages. We found that zinc sequestration is responsible for HIF-1 α activation. Furthermore, growing macrophage and fibroblast cells together with AIEC causes an increase in pro-fibrotic genes. This requires that AIEC, macrophages and fibroblasts interact together. In the context of pro-fibrotic effects, NF- κ B activation is necessary but not sufficient. However, Ybt alone serves as a trigger for HIF-1 α activation. Together, these results suggest that as intestinal macrophages encounter AIEC, Ybt sequesters zinc. This causes an accumulation of nuclear HIF-1 α . This imbalance of metal balance drives pro-fibrotic macrophage and fibroblast activation. Ultimately, the failure to control fibrosis can lead to intestinal fibrotic lesions in patients with IBD.

